

CLAIMS

1. A method of delivering data packets over a bus that supports both isochronous and asynchronous modes of data transmission, comprising the steps of:

(1) at a transmitting node, translating a bus-generic request for a quality-of-service connection into a bus-specific request for time-guaranteed delivery services;

(2) from the transmitting node, transmitting the bus-specific request to an intended receiving node on the bus;

(3) at the intended receiving node, checking to determine whether sufficient resources are available to allocate an isochronous data channel on the bus and, in response to such availability, allocating the isochronous data channel;

(4) notifying the transmitting node of the allocated isochronous data channel; and

(5) from the transmitting node, transmitting data packets to the intended receiving node using the allocated isochronous data channel.

2. The method of claim 1, further comprising the step of setting a timer in the transmitting node and, in response to detecting a time-out condition based on the request transmitted in step (2), transmitting the data packets to the intended receiving node using the asynchronous delivery mode.

3. The method of claim 2, wherein the asynchronous delivery mode comprises transmitting the data packets using an asynchronous streaming delivery mode.

4. The method of claim 2, wherein the asynchronous delivery mode comprises transmitting the data packets using an asynchronous write operation mode.

5. The method of claim 1, further comprising the steps of:

(6) periodically transmitting from the intended receiving node a "keep alive" message indicating that resources have been allocated;

(7) in the transmitting node, monitoring the "keep alive" message periodically transmitted from the intended receiving node and, in response to detecting that the "keep alive" message is no longer being transmitted, reverting to a mode wherein the data packets are transmitted to the intended receiving node using the asynchronous delivery mode.

6. The method of claim 1, further comprising the steps of:

(6) periodically transmitting from the transmitting node to the intended receiving node a "keep alive" message indicating that the transmission is continuing;

(7) in the intended receiving node, monitoring the "keep alive" message periodically transmitted by the transmitting node and, in response to detecting that the "keep alive" message is no longer being periodically transmitted, deallocating the bus resources.

7. The method of claim 1, wherein steps (1) through (5) are performed in computer nodes that are coupled to an IEEE-1394 serial bus.

8. The method of claim 1, wherein step (2) is performed in response to a quality-of-service request made by an application program executing in the transmitting node.

9. A computer-readable medium comprising computer instructions which, when executed by a transmitting node coupled to a computer bus that provides both isochronous and asynchronous data delivery facilities, performs the steps of:

(1) translating a bus-generic request for a quality-of-service connection into a bus-specific request for time-guaranteed delivery services;

(2) transmitting the bus-specific request to an intended receiving node on the computer bus; and

(3) in response to receiving a message from the intended receiving node indicating that an isochronous data channel on the computer bus has been allocated, transmitting a plurality of data packets over the allocated isochronous data channel.

10. The computer-readable medium of claim 9, wherein the computer instructions further perform the step of:

(4) setting a timer in the transmitting node and, in response to detecting a time-out condition based on the request transmitted in step (2), transmitting the data packets to the intended receiving node using the asynchronous delivery mode.

11. The computer-readable medium of claim 10, wherein the asynchronous delivery mode comprises transmitting the data packets using an asynchronous streaming delivery mode.

12. The computer-readable medium of claim 10, wherein the asynchronous delivery mode comprises transmitting the data packets using an asynchronous write operation mode.

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13. The computer-readable medium of claim 9, wherein the computer instructions comprise instructions that perform the step of monitoring a "keep alive" message periodically transmitted from the intended receiving node and, in response to detecting that the "keep alive" message is no longer being transmitted, reverting to a mode wherein the data packets are transmitted to the intended receiving node using the asynchronous delivery mode.

14. The computer-readable medium of claim 9, wherein the computer instructions further comprise instructions that perform the step of periodically transmitting from the transmitting node to the intended receiving node a "keep alive" message indicating that the transmission is continuing.

15. ~~A method of delivering data packets over a bus that supports both isochronous and asynchronous modes of data transmission, comprising the steps of:~~

(1) from a transmitting node, transmitting data packets to an intended receiving node using the asynchronous mode of data transmission;

(2) in the intended receiving node, detecting that data packets are repeatedly received from the transmitting node and, in response thereto, allocating an isochronous data channel on the bus;

(3) notifying the transmitting node of the allocated isochronous data channel; and

(4) from the transmitting node, transmitting the data packets to the intended receiving node ~~using the allocated isochronous data channel.~~

16. The method of claim 15, further comprising the steps of:

(5) periodically transmitting from the intended receiving node a "keep alive" message indicating that resources have been allocated;

(6) in the transmitting node, monitoring the "keep alive" message periodically transmitted by the intended receiving node and, in response to detecting that the "keep alive" message is no longer being transmitted, reverting to a mode wherein the data packets are transmitted to the intended receiving node using the asynchronous delivery mode.

17. The method of claim 15, further comprising the steps of:

(5) periodically transmitting from the transmitting node to the intended receiving node a "keep alive" message indicating that the transmission is continuing;

(6) in the intended receiving node, monitoring the "keep alive" message periodically transmitted by the transmitting node and, in response to detecting that the "keep alive" message is no longer being periodically transmitted, deallocating the bus resources.

18. The method of claim 15, wherein step (2) comprises the step of detecting that a high traffic condition exists for data packets having a common IP address.

19. A computer-readable medium comprising computer instructions which, when executed by a receiving node coupled to a computer bus that provides both isochronous and asynchronous data delivery facilities, performs the steps of:

10 (1) detecting that data packets are repeatedly received from a transmitting node using the asynchronous data delivery facilities of the computer bus and, in response thereto, allocating an isochronous data channel on the bus;

(2) notifying the transmitting node of the allocated isochronous data channel; and

(3) receiving data packets from the transmitting node over the allocated isochronous data channel.

15 20. The computer-readable medium of claim 19, wherein the computer instructions further comprise instructions that perform the step of periodically transmitting a "keep alive" message on the computer bus indicating that resources have been allocated.

20 21. The computer-readable medium of claim 19, wherein the computer instructions further comprise instructions that perform the step of monitoring a "keep alive" message periodically transmitted by the transmitting node and, in response to detecting that the "keep alive" message is no longer being periodically transmitted, deallocating the bus resources.

22. The computer-readable medium of claim 19, wherein the computer instructions comprise instructions that implement step (2) by detecting that a high traffic condition exists for data packets having a common IP address.

25 23. A method of providing time-guaranteed delivery of data packets over a bus that supports both isochronous and asynchronous modes of data transmission, comprising the steps of:

(1) establishing an isochronous mode of data communication over the bus between a transmitting node and a first receiving node and transmitting a plurality of data packets from the

transmitting node to the first receiving node over an isochronous data channel allocated by the first receiving node;

(2) in a second receiving node, receiving information regarding the isochronous data channel allocated to support the transmission of data packets in step (1); and

5 (3) in the second receiving node, receiving the plurality of data packets from the transmitting node using the isochronous data channel allocated in step (1).

24. The method of claim 23, further comprising the step of setting a flag in the first receiving node indicating that the second receiving node is sharing the allocated isochronous data channel, wherein the first receiving node inhibits deallocation of the allocated isochronous data channel if the
10 flag is set, and otherwise deallocates the allocated isochronous data channel if it is no longer to be used by the first receiving node.

25. A computer-readable medium comprising computer instructions which, when executed by a computer node coupled to a bus that supports both isochronous and asynchronous data transmission modes, performs the steps of:

15 (1) establishing an isochronous mode of data communication over the bus and receiving a plurality of data packets over an isochronous data channel allocated by the computer node;

(2) in response to receiving a request to share the isochronous data channel by another computer node, setting a flag that inhibits deallocation of the isochronous data channel while it is being shared by the another computer node; and

20 (3) in response to detecting that the isochronous data channel is no longer needed and is not being shared by the another computer node, deallocating the isochronous data channel.

26. A system comprising a first computer node and a second computer node coupled over a communication bus that provides both asynchronous and isochronous communication modes,

25 wherein the first computer node transmits a request for time-guaranteed bandwidth using the isochronous communication mode to the second computer node and, in response to detecting a time-out condition for failing to receive a response to the request, transmits data packets to the second computer node using the asynchronous communication mode.